Sample Return Robot (SRR)

Completed Technology Project (2011 - 2016)

Project Introduction

This Challenge requires demonstration of an autonomous robotic system to locate and collect a set of specific sample types from a large planetary analog area and then return the samples to the starting zone. The roving area includes open rolling terrain, granular medium, soft soils, and a variety of rocks, and immovable obstacles (trees, large rocks, water hazards, etc.) A pre-cached sample and several other samples will be located in smaller sampling zones within the larger roving area. Competitors will be given aerial/geological/topographic maps with appropriate orbital resolution, including the location of the starting position and a pre-cached sample. GPS use or other terrestial naviagtion aids are not allowed. The samples will be easily distinguished from other materials present at the site. Samples will have different point values and the prizes will be determined based on the scores for number and point value of samples collected and returned to the starting location. In order to win a Level-1 prize, a robot must autonomously navigate at all times and must retrieve a pre-cached sample within the 30-minute time limit. In order to win a Level-2 prize, a robot must autonomously navigate at all times and must retrieve the pre-cached sample and other samples distributed over the roving area within the two-hour time limit. The prize purse is $1.5 million. 2012: Eleven teams registered for the competition on June 15-18, 2012, in Worcester, MA. There were no successful entrantants. 2013: Fourteen teams registered for the competition on June 4-8, 2013, in Worcester, MA. Team Survey of Los Angeles, CA recieved $5,000 for meeting Level I requirements. 2014: Registration is open for the 2014 competition which will be June 10-13, 2014, in Worcester, MA.

Anticipated Benefits

Demonstrate robots that locate/retrieve pre-defined samples without human control or terrestrial navigation aids. This challenge encourage innovations in robotic navigation, sample manipulation and collection technologies. This is an area of a lot of interest on Earth and needed to get Mars ready for humans.

Project Image Sample Return Robot

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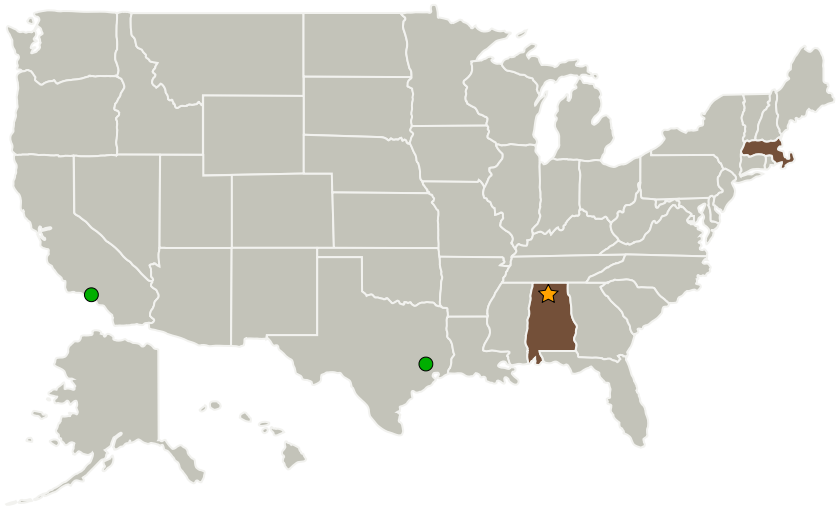
Primary U.S. Work Locations and Key Partners



Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Prizes, Challenges, and Crowdsourcing

Project Management

Program Director:

Amy P Kaminski

Program Manager:

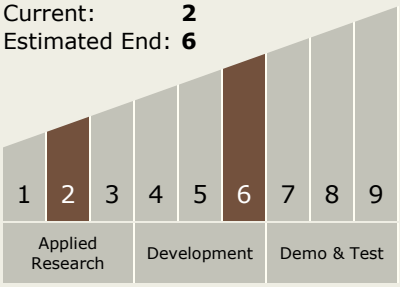
Monserrate C Roman

Principal Investigator:

Colleen Shaver

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **6**



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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
39e	Supporting Organization	Industry	
Army of Angry Robots Group	Supporting Organization	Industry	
Gather	Supporting Organization	Industry	
Intergalatic Retrieval Service	Supporting Organization	Industry	
●Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
●Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas
LunamBotics, Universidad Nacional Autonoma de Mexico(UNAM)	Supporting Organization	Academia	
MAXed Out	Supporting Organization	Industry	
Middleman	Supporting Organization	Industry	Dunedin, Florida
Mind and Iron	Supporting Organization	Industry	
Ohio State University-Main Campus	Supporting Organization	Academia	Columbus, Ohio
Oregon State University	Supporting Organization	Academia	Corvallis, Oregon

Continued on following page.

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.3 Sample Handling

Organizations Performing Work	Role	Type	Location
Pennsylvania State University-Main Campus(Penn State)	Supporting Organization	Academia	University Park, Pennsylvania
Rensselaer Polytechnic Institute	Supporting Organization	Academia	Troy, New York
Retrievers High School	Supporting Organization	Academia	
Robo Retrievers	Supporting Organization	Industry	
Sirius XM Holdings	Supporting Organization	Industry	
Smart Move	Supporting Organization	Industry	
Smart Tools	Supporting Organization	Industry	
Spark	Supporting Organization	Industry	
State University of New York Robo Crew	Supporting Organization	Academia	New York
Survey	Supporting Organization	Industry	Los Angeles, California
Svechdt, LLC	Supporting Organization	Industry	
Texas Titans	Supporting Organization	Industry	Texas
University of Alabama Astrobotics	Supporting Organization	Academia	Alabama
West Virginia University	Supporting Organization	Academia	Morgantown, West Virginia

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Primary U.S. Work Locations	
Alabama	Massachusetts

Images

15166.jpg
Project Image Sample Return Robot
(https://techport.nasa.gov/image/1231)

4851-1377713473950.jpg
Project Image Sample Return Robot
(https://techport.nasa.gov/image/2261)

Project Website:

http://www.nasa.gov/robot